nated the weather over the whole country east of the Rocky Mountains.

II.—This storm was developing for several days on the north Pacific coast, previous to 6th, being kept back by high area I. Afternoon of 6th the lowest pressure of the month was reported from Calgary. There was a remarkable absence of rain in the southeast quadrant of this storm throughout its motion during 5 days. As was noted in the March REVIEW, this was due in part to the enormous mass of warm, dry air that was poured into the low area from the high area to the se. and s. The gradients from south winds became very steep on 7th, causing a wind of 48 miles per hour at Huron, S. Dak., and 42 per hour at Fort Sully, S. Dak. The rain condition in the rear of this storm was marked, the heaviest precipitation of the month at Fort Assinniboine, Mont. (1.16), occurring on 8th.

III.—In many respects this was the most remarkable storm of the month. While II was passing off the Nova Scotia coast, 11th, an offshoot or secondary was developing off the middle Atlantic coast, p. m., 11th. The movement of this storm was like that of I, down the Atlantic coast, being in part forced back by high area II. Heavy rains occurred in the interior of North Carolina, over 3 inches falling in 36 hours at Charlotte, 12th and 13th. This storm moved down the coast and recurved in South Carolina, 13th. It then passed up the coast, disappearing in the Gulf of Saint Lawrence, 18th. Almost the only rain of the month in the interior of New York occurred during its progress.

IV.—This storm began in Manitoba, 13th. Its motion was along the north border of the country and, like II, there was very little rain in its southeast quadrant. It was merged with III during 16th.

V.—Came down to Manitoba from the northwest. It was somewhat retarded in its progress at first by high area IV. The gradients were somewhat similar to those in II. On the night of 19th appearances indicated violent storms for Iowa, which were predicted for the next afternoon. Violent storms were also predicted the next morning for north portions of Missouri and Illinois. An examination of the chapter on winds will show that the severest tornadoes of the month occurred in Missouri, Iowa, and Illinois on the afternoon of 20th. The heaviest rain of the month in Mississippi (3.50) occurred at Brookhaven, 19th.

VI.—While the former storm was moving east a trough of low pressure extended from it sw. to Texas on 20th. The lower portion of this trough gradually filled up and disappeared in Iowa on 22d. On this date a slight influence from the above secondary may have extended far to the northwest and united with storm number VI. This storm had very slight intensity and moved almost its entire distance along the north border of the country, passing into the Gulf of Saint Lawrence on 27th. Very slight rains and winds attended its course. In connection with this storm there was a widely-extended disturbed region to the southward on 24th and 25th, but no well-defined storm. A severe local outburst occurred in se. Kansas on night of 24–25th, 2.08 inches of rain in 24 hours being reported at Wichita.

VII.—This storm appeared in Alberta on 26th, and its motion and formation were dependent in a large measure upon high area VI, which had advanced to the southeast in its front. The motion of this storm, 15 miles per hour, was very slow, and, in fact, it did not move to the east of the Mississippi River before the end of month, being hindered by the high already mentioned.

VIII.—This was a remarkable storm in that it moved almost due west. It originated on 26th in se. Georgia, and was last noted on 28th in se. Mississippi. Very heavy rains were reported from North Carolina, South Carolina, Georgia, and Florida during its progress. The velocity was the least of any storm during the month, 9 miles per hour.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.									
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.
High areas.		°	°	°	°	*Days.*	*Miles.*		*Inch.*			°					
I	1	52	110	30	90	9.0	14	Green Bay, Wis	.38	4	Bismarck, N. Dak	16	1	Chicago, Ill	ne.	36	3
II	8	45	124	41	69	6.5	25	Marquette, Mich	.44	10	Fort Assinniboine, Mont	30	8	Kitty Hawk, N.C	ne.	36	13
III	12	51	101	47	56	4.0	23	Port Arthur, Ont	.28	13	Moorhead, Minn	21	13	Marquette, Mich	nw.	28	13
IV	12	43	126	43	64	8.0	22	Bismarck, N. Dak	.44	15	Cheyenne, Wyo	26	15	Chicago, Ill	ne.	38	16
V	18	47	127	40	70	6.5	23	Saint Paul, Minn	.48	21	Denver, Colo	26	20	Fort Custer, Mont	se.	36	21
VI	23	53	117	45	62	6.0	21	Fort Buford, N. Dak	.32	24	Marquette, Mich	25	24	Atlantic City, N. J	ne.	30	27
VII	28	55	114	46	62	3.0	35	Qu'Appelle, N. W. T	.44	29	Swift Current, N. W. T	22	28	Qu'Appelle, N. W. T	ne.	24	28
Mean						6.1	23		.40			24				33	
Low areas.									Fall.			Rise.					
I	4	36	77	30	80	1.5	28	Savannah, Ga	.16	5	Savannah, Ga	10	5	Kitty Hawk, N.C	ne.	42	5
II	6	50	112	46	58	5.5	25	Minnedosa, Man	.40	6	Fort Assinniboine, Mont	32	6	Montreal, Quebec	sw.	48	10
III	11	40	73	50	65	6.5	18	Eastport, Me	.30	16	Augusta, Ga	13	11	Sandy Hook, N.J	nw.	39	17
IV	13	54	107	47	77	2.0	33	Port Arthur, Ont	.42	14	Huron, S. Dak	20	13	Chicago, Ill	n.	48	15
V	16	53	112	45	57	6.5	21	Father Point, Quebec	.34	21	Saint Vincent, Minn	24	17	Atlantic City, N.J	nw.	48	22
VI	22	52	112	48	60	4.5	30	Duluth, Minn	.22	23	Duluth, Minn	20	23	Sioux City, Iowa	nw.	32	24
VII	26	54	111	42	97	5.0	15	Fort Sully, S. Dak	.30	27	Saint Vincent, Minn	24	26	Huron, S. Dak	s.	44	28
VIII	26	32	82	30	87	2.0	9	Wilmington, N. C	.10	26	Montgomery, Ala	9	27	Kitty Hawk, N.C	ne.	46	27
Mean						4.2	22		.28			19				44	

NORTH ATLANTIC STORMS FOR MAY, 1891 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the storms that appeared over the west part of the north Atlantic Ocean during May, 1891, are shown on Chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

The month was unmarked by storms of marked severity. On the 1st a storm, which had advanced from the southwest during the latter part of April, was central on the southwest edge of the Banks of Newfoundland, with central pressure about 29.20 (742), and fresh to strong gales, whence it moved northeastward and disappeared in the direction of Iceland after the 4th. On this date a storm, with pressure below 29.20 (742), was central over or near extreme north Scotland, whence it apparently moved eastward over the North Sea. On the 5th a feeble storm was central off the south Atlantic coast, and a storm, with pressure below 29.50 (747), was central over the

west part of the Gulf of Saint Lawrence. On the 6th a storm was central west of Bermuda, and the pressure fell to 29.65 (753) at Bermuda, with fresh south wind; moving thence northeast the storm was central over the Banks of Newfoundland on the 7th, with pressure below 29.70 (754), whence it passed north of the region of observation by the 8th. The storm which was central over the Gulf of Saint Lawrence on the 5th and 6th probably moved southeastward and united with this storm. On the 7th a storm was central off Ireland, whence it apparently moved southeast and disappeared over France by the 9th. On the 10th a storm was central about midway between the Azores and the Grand Banks, where it remained nearly stationary until the 12th, after which it disappeared.

On the 11th a storm of slight energy was central north of the Bahamas, from which position it moved north of east and on the 12th was central west of Bermuda, where the pressure fell to 29.73 (755). Moving thence northeast the storm was central south of Nova Scotia on the 13th, off east Nova Scotia on the 14th, and by the 15th had disappeared north of the region of observation. On the 14th and 15th a storm of moderate energy was central off the south Atlantic coast; on the 16th it was off the middle Atlantic coast, and by the 17th had advanced to New Brunswick, after which it passed northeast over the Gulf of Saint Lawrence and disappeared north of the region of observation. On the 15th a storm was apparently central over the North Sea. From the 17th to 24th the pressure continued low over and near the British Isles, and on the 23d and 24th a storm apparently moved eastward from west of Ireland. From the 22d to 24th a storm of moderate strength moved from the Gulf of Saint Lawrence to the north edge of the Grand Banks, after which it passed north of the region of observation. From the 26th to the close of the month the pressure continued low over the British Isles and the ocean to the westward. On the 26th and 27th a storm passed over the Gulf of Saint Lawrence and thence north of Newfoundland. On the 28th a storm of slight energy was central over the east part of the Gulf of Mexico, and on the 31st a storm was central over the Banks of Newfoundland.

FOG IN MAY.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on Chart I by dotted shading. Near the Banks of Newfoundland fog was reported on 12 dates; between the 55th and 65th meridians on 11 dates; and west of the 65th meridian on 8 dates. Compared with the corresponding month of the last 3 years the dates of occurrence of fog near the Grand Banks numbered 8 less than the average; between the 55th and 65th meridians 4 less than the average; and west of the 65th meridian 12 less than the average. On the dates fog was reported in the regions referred to it occurred with the approach or passage of general storms.

OCEAN ICE IN MAY.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for May during the last 9 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
May, 1883	40 30	47 00	May, 1883	45 40	45 12
May, 1884	41 30	47 30	May, 1884	43 30	44 50
May, 1885	40 50	48 15	May, 1885	42 30	40 10
May, 1886	41 30	51 30	May, 1886	48 55	46 13
May, 1887	39 38	46 00	May, 1887	39 38	46 00
May, 1888	41 00	46 00	May, 1888	41 00	46 00
May, 1889	43 07	55 47	May, 1889	49 46	36 48
May, 1890	40 50	50 28	May, 1890	44 12	36 25
May, 1891	40 49	49 07	May, 1891	48 00	45 00
Mean	41 06	49 04	Mean	44 48	42 58

On the 7th 3 small pieces of ice were reported in N. 49° 03′, W. 33° 40′.

The southernmost ice reported, a small berg noted on the 13th, was about one-fourth degree south, and the easternmost ice, icebergs observed on the 11th, was 2° west of the average southern and western limits of ice for the month, as determined from reports of the last 8 years. For the current month ice was most frequently reported along the east edge of the Banks of Newfoundland. During the latter half of the month icebergs were reported near the southeast Newfoundland coast. In the early part of the month field ice interfered with navigation on the Cape Breton and east Nova Scotia coasts and about the Magdalen Islands in the Gulf of Saint Lawrence. Compared with the corresponding month of preceding years the ice reported for the current month about corresponded in quantity and distribution with the May average. The limits of the region within which Arctic ice was reported for May, 1891, are shown on Chart I by ruled shading.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for May, 1891, is exhibited on Chart II by dotted isotherms. In the table of Signal Service data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature was highest in the central and east parts of San Diego Co., Cal., and at stations in the middle Gila valley, where it was above 80, and the mean readings were above 70 over the south part of the east and west Gulf states, in Florida, the adjoining parts of west Arizona and southeast California, and at stations in the Sacramento and San Joaquin valleys. The mean temperature was lowest at mountain stations in central Colorado, where it was below 40, and it was below 50 in east and north New England, over the north part of the Lake region, and generally at Canadian stations east of the 105th meridian. On the southeast New England coast, and at stations on the immediate Pacific coast north of San Francisco, Cal., the mean temperature was below 55.

The mean temperature was below the normal, except in the Canadian Maritime Provinces, and within an area extending from the north Pacific coast southeastward over the middle plateau region, and thence to Lake Superior. The greatest departure below the normal temperature occurred in the middle Ohio valley, where it was more than 4, and the departure below the normal was 2 or more on the middle and south Pacific coasts and in southwest Arizona, and from the southeast slope of the Rocky Mountains eastward to the Atlantic coast states, New York City being the only station south of the Lake region where the mean temperature was above the normal. In districts where the mean temperature was above the normal the departure was less than 2, except at Chatham, N. B., and Spokane Falls, Wash., where it was 3.5 and 2.8, respectively.

On the 5th unusually cold weather prevailed east of the Missouri and Mississippi rivers, freezing weather being reported generally in the Lake region, Minnesota, and the Da-